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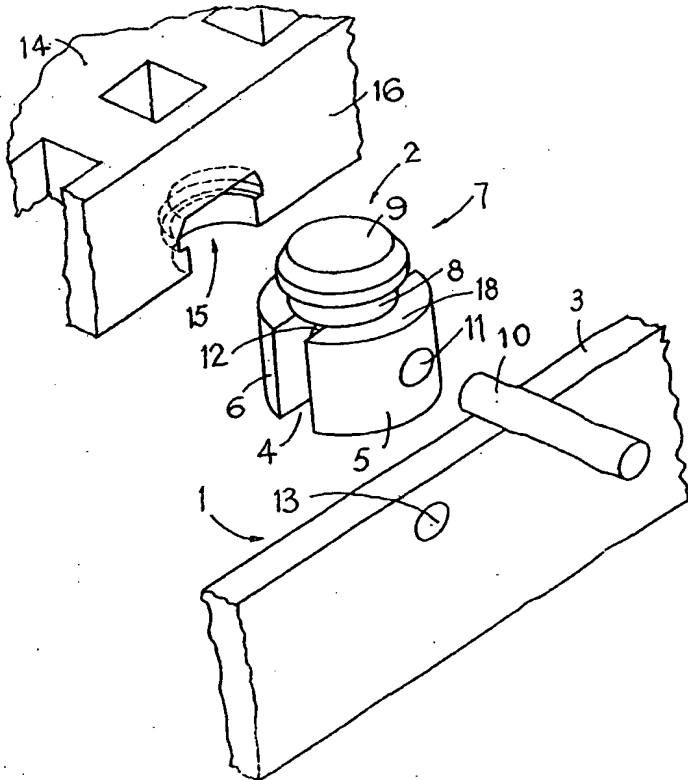
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[Continued on next page]

(54) Title: FASTENING MEANS FOR SCREENS



(57) Abstract: Polyurethane panel type screens are supported on steel stringers (1) that have a narrow and deep cross sectional shape, with saddles (2) fitted onto the top edges (3) of the stringers. The saddles (2) are moulded in polyurethane (optionally with embedded steel reinforcement) to a shape that has a slot (4) for the stringer (1) with skirts (5, 6) depending on either side, with head, neck and shoulder formations for holding two contiguous panels. The formations engage matching recesses in the sides of the panels. The saddles (2) are pinned to the stringer by pins (10) that pass through the saddle skirts (and metal reinforcing of present) and the stringer.

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Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

FASTENING MEANS FOR SCREENS**FIELD OF THE INVENTION**

5

This invention lies in the field of screening particulate material and relates to screens for this purpose. Important but non-limiting examples are screens that are used extensively in grading of ores and other materials in mining and process operations. Apart from woven wire screens and perforated sheet and plate screens, screens made up of a plurality of screening panels assembled in tiling fashion on the screening frame, have attained wide application. Such screening panels are typically manufactured by casting a suitable grade of polyurethane and there are many designs for securing the panels mounted contiguously in a tiling fashion on a screening frame.

15

BACKGROUND

The screening frame carries the screen and must satisfy arduous demands arising from such factors as the vibratory operation, the substantial loading from the material being screened, the clogging and the abrasive properties typical of materials encountered in screening practice.

20

South African patent 95/00711 granted to Screenex Wire Weaving Manufacturers (Pty) Ltd describes a frame component which is in the form of an elongate bar having a much narrower width than its depth and at spaced apart intervals a plurality of sockets mounted in recesses or notches taken out of the top edge of the bar, the sockets being wider than the width of the bar. The polyurethane panels have depending pegs, which fit into the sockets, to mount the panels. Typically pairs of pegs will fit together in each socket, to mount contiguous panels in each socket.

30

European patent application 86 902292.1 in the name of Institut Po Technischeska Kibernetika I Robotika published under number 0 243 500

discloses a similar narrow and deep stringer with panel supports straddling the bar, each panel support presenting two brackets, one on each side of the stringer. There is a hole in each bracket for anchoring a fixing collar and pin, which passes through a screening panel from its top surface, into the bracket hole, to mount one panel.

PCT patent application in the name of the present inventor published under WO 00/73669 A1 describes a similar narrow and deep notched bar or "stringer" carrying discs welded at the top edge of the bar at each notch; a bolted pin passes through a hole in each disc and secures a holding component which holds down two polyurethane panels. Typically each holding component engages the edges of contiguous panels, to mount them.

While these designs all have the important advantages of the narrow stringer, which minimises the obscuring or clogging of screening area, they achieve this at the cost of other disadvantages.

The South African patent and the PCT application have the advantage of each single holding component holding two contiguous panels but at the cost of the notches in the stringers, which incur manufacturing costs and reduce the strength and fatigue endurance of the stringer under the reciprocating bending loads, which prevail. In the case of the design described in the PCT application moreover, each bolted pin requires the assembly of a toggle, washer and nut and must be protected from abrasion by a cover fitted after securing the panels.

The European application avoids the notches in the stringer but the two brackets presented by each panel support requires twice the number of fixing means and obscure a part of the panel on each side of the stringer.

THE INVENTION

5 The present invention provides a screening panel fastening means for a narrow and deep stringer of a screen support frame, which fastening means includes a saddle which has a slot that fits over the top edge of the stringer with skirts depending on either side of the stringer and the saddle pinned to the stringer by a transverse pin passing through the stringer and skirts of the
10 saddle, the upper part of the saddle adapted for holding the panel(s) onto the stringer.

The stringer is not notched but only drilled for the transverse pin, giving a manufacturing simplicity and cost reduction as well as avoidance of
15 weakening notches in the top edge of the stringer.

The upper part of the saddle is preferably adapted for holding the panels by means of formations, which engage with co-acting shapes in the panel(s), preferably on the panel edges so that each formation holds two contiguous
20 panels.

Preferably the upper part of the saddle does not penetrate through to the upper surface of the panel(s), so that the panel protects the saddle from the abrasive action common in the materials being screened.
25

The formations may comprise a neck part and above it a head, which fit into co-acting indentations in the edges of contiguous panels.

The saddle may comprise a polymeric material with an embedded metal
30 reinforcement. The embedment of the reinforcement offers the advantage of protection of the metal from abrasion that is so prevalent in many screening applications. Although the metal is preferably fully embedded, it may have limited parts protruding and the term "embedded" used herein is intended to

include in its meaning partial embedment. The reinforcement may have a saddle-like shape, for example.

THE DRAWINGS

5

The invention will be more fully described by way of a non-limiting example with reference to the drawings, in which : -

10 figure 1 is an isometric view of a screening panel fastening means, mounted on a stringer,

figure 2 is an isometric "exploded" view of a stringer, fastening means and one panel,

15 figure 3 is an isometric view of the fastening means assembled to hold two panels, one shown in broken lines to ease illustration,

figure 4 is a cross sectional elevation of a reinforced saddle, and

20 figure 5 is plan view on the reinforced stringer.

THE PREFERRED EMBODIMENTS

25 As shown in figures 1 to 3 of the drawings, a narrow and deep stringer or beam is a component of the screen frame, which supports the polyurethane panels of the screen. The depth of the stringer of course confers good strength to resist the downwards (and upwards) bending forces which are generated as a result of the shaking action of the screen. The narrowness
30 minimises the "dead" or obscured area of the screen where screening apertures must be omitted and/or blinding of the screening apertures tends to be caused.

The fastening means includes a saddle 2 which is slotted by a slot 4 to fit over the top edge 3 of the stringer and has skirts 5 and 6 depending on either side of the slot. The upper part 7 of the saddle has formations for holding panels to the stringer, being a neck 7 and a head 9. The saddle is fixed to the stringer
5 by a pin 10 which passes transversely through holes 11 and 12 in the skirts and a hole 13 in the stringer.

The panel 14 has co-acting indented shapes 15 in the panel edges 16, being the female or hollow shapes which exactly fit the saddle on one side of the
10 stringer. The broken lines 17 in figure 3 indicate the second panel which is also held by the one saddle shown, being fitted in the position shown by these broken lines.

The saddle has a shoulder 18 immediately below the neck, which provides a
15 support surface for the panels, in addition to the top surface of the stringer providing support.

The saddle may be made of steel or polyurethane or another higher strength polymer, like a suitable grade of polyamide, for example.

20

The saddle may be made of a polymeric material with suitable reinforcement, for example, an embedded reinforcement of steel, fibre or strand reinforcement.

25 The pin may be made of a suitable grade of polyamide, like Nylon 6, for example, or steel.

Figures 4 and 5, show a reinforced screening panel fastening means 20 for a narrow and deep stringer 21 of a screen support frame. The fastening means
30 includes a saddle 22 which has a slot 23 that fits over the top edge 24 of the stringer, with skirts 25 and 26 depending on either side of the stringer and the saddle pinned to the stringer by a transverse pin 27 passing through the stringer and skirts of the saddle. The upper part of the saddle is adapted for

holding two panels onto the stringer by means of a head 28, below it a neck 29 and below that a shoulder 30 that engage the edges of the panels in a manner shown already in figures 2 and 3, for example. A metal reinforcement 31 is embedded in the fastening. The metal reinforcement is in the form of an inverted U-shaped strap thus conferring a reinforcement that co-operates with the saddle form of the fastening. The pin passes through both the saddle and the metal reinforcing.

The fastening can be moulded in a suitable (fairly hard) formulation of polyurethane and the strap can be a suitable grade of steel. The fastening is thus inexpensive but effective. The dimensioning of the head, neck and shoulder must be such that they will retain a panel against upward and downward forces of at least 10 times to 20 times the mass of the panel downwards and 20 times to 30 times upwards. These figures must be modified according to reciprocating accelerations in a given application.

REFERENCE NUMERALS LIST

	1	stringer
5	2	fastening means
	3	top surface of stringer
	4	slot in fastening means
	5	skirt of fastening means
	6	skirt of fastening means
10	7	upper part of fastening means
	8	neck of fastening means
	9	head of fastening means
	10	transverse pin
	11	hole for pin in skirt
15	12	hole for pin in skirt
	13	hole in stringer for pin
	14	screening panel
	15	indentations in panel edge
	16	panel edges
20	17	broken lines showing second panel
	18	shoulder of saddle
	19	-
	20	fastening means
	21	stringer
25	22	saddle
	23	slot
	24	top of stringer
	25	skirt
	26	skirt
30	27	pin
	28	head
	29	neck
	30	shoulder

CLAIMS:

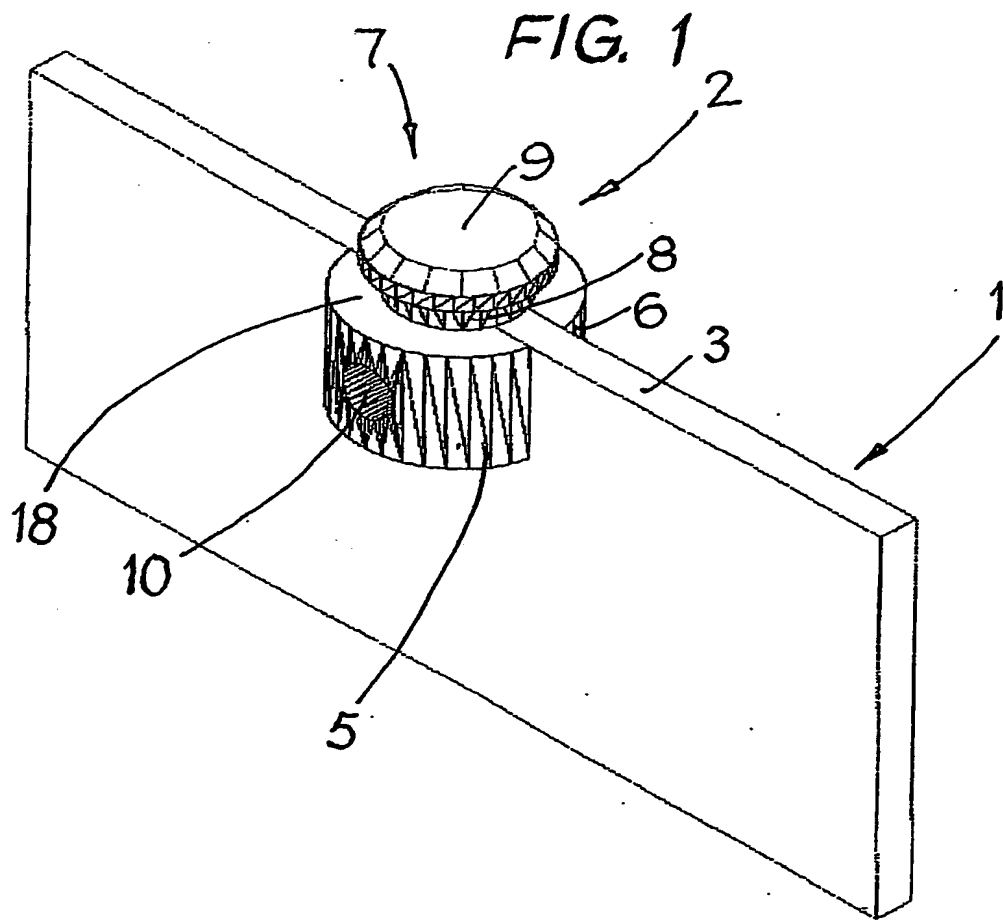
- 5 1. A screening panel fastening means for a narrow and deep stringer of a screen support frame, which fastening means includes a saddle which has a slot that fits over the top edge of the stringer with skirts depending on either side of the stringer and the saddle pinned by a pin to the stringer by a transverse pin passing through the stringer and skirts of the saddle, the upper part of the saddle adapted for holding the panel(s) onto the stringer.
- 10 2. A screening panel fastening means as claimed in claim 1, in which the upper part of the saddle is adapted for holding the panels by means of formations, which engage with co-acting shapes in the panels edges so that each formation holds two contiguous panels.
- 15 3. A screening panel fastening means as claimed in claim 2, in which the formations comprise a head, below that a neck and below that a shoulder.
- 20 4. A screening panel fastening means as claimed in any one of claims 1 to 3, in which the upper part of the saddle does not penetrate through to the upper surface of the panel(s), so that the panel protects the saddle from the abrasive action common in the materials being screened.
- 25 5. A screening panel fastening means as claimed in any one of claims 1 to 4, in which the saddle comprises a polymeric material with an embedded metal reinforcement.
- 30 6. A screening panel fastening means as claimed in claim 5, in which the reinforcement is in the form of a saddle-shaped strap.

7. A screening panel fastening means as claimed in any one of claims 1 to 6 and a stringer that is not notched but only drilled for the transverse pin.

5 8. A screening panel fastening means as herein described and as illustrated in figures 1 to 3 of the drawings.

9. A screening panel fastening means as herein described and as illustrated in figures 4 and 5 of the drawings.

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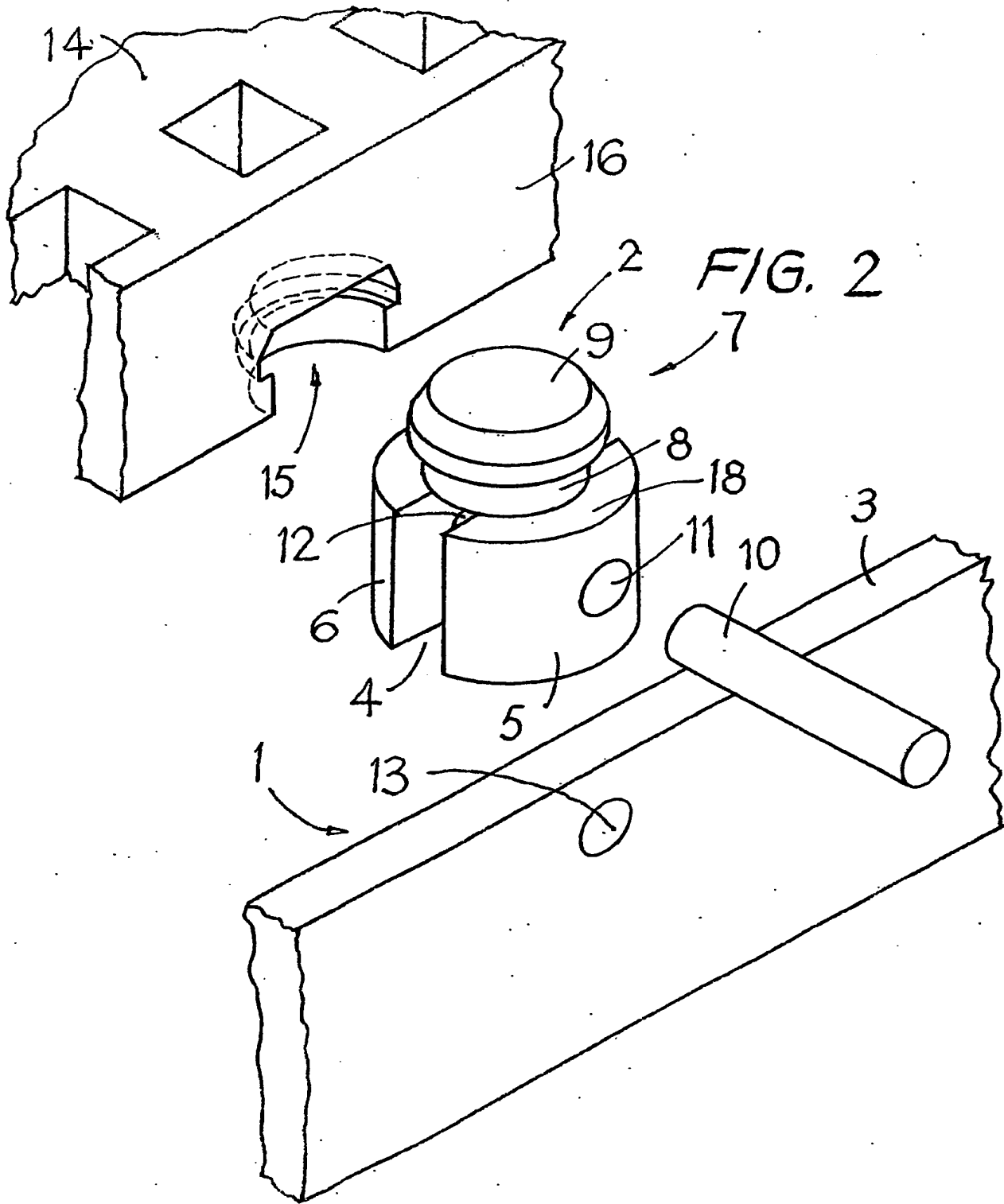


FIG. 3

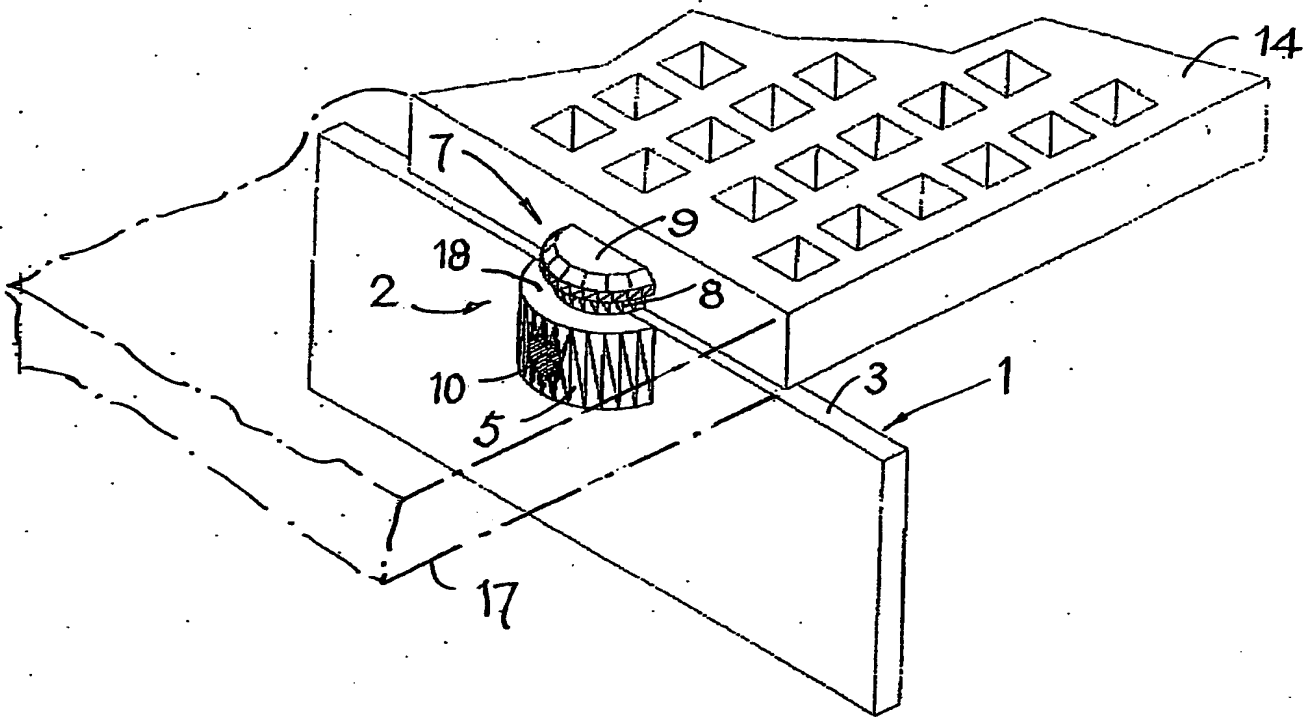


FIG. 4

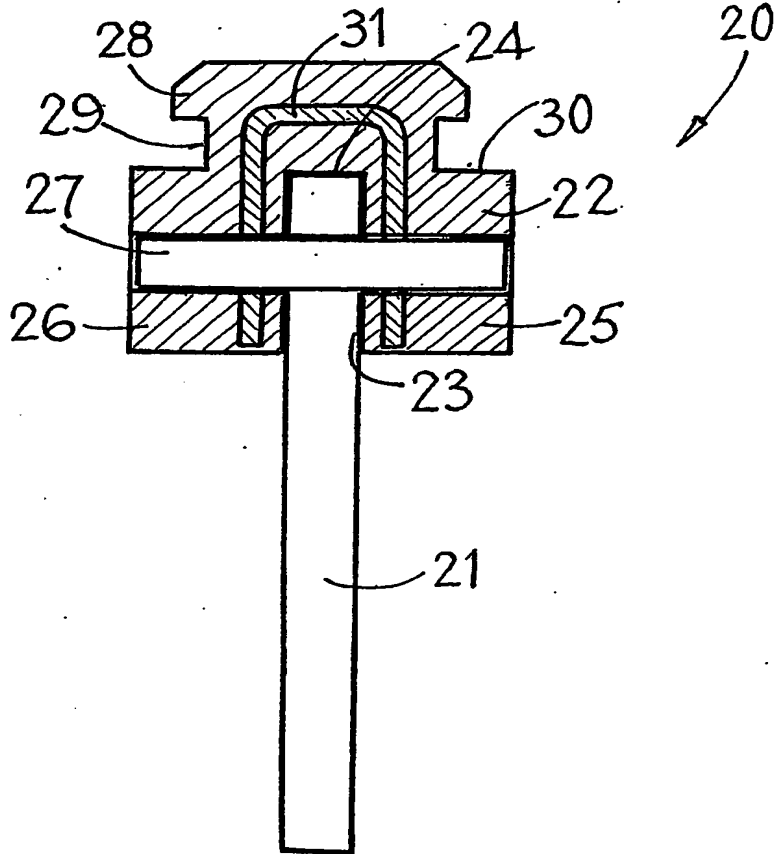
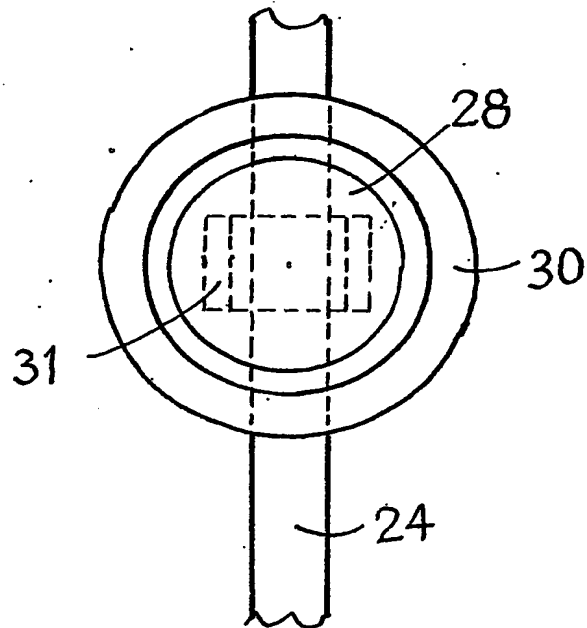


FIG. 5



INTERNATIONAL SEARCH REPORT

International Application No

PCT/ZA 02/00201

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B07B1/46

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B07B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01 58602 A (WESTERN WIRE WORKS) 16 August 2001 (2001-08-16)	1-4,7-9
Y	page 11, line 17 -page 12, line 20 page 15, line 1 - line 24 page 18, line 17 -page 21, line 23 figures 1,9A,10-14B	5,6
Y	GB 2 252 127 A (MERCOL DESCALING) 29 July 1992 (1992-07-29)	5,6
A	page 4, line 3 -page 6, line 5 figures	1
X	WO 00 64599 A (DUREX) 2 November 2000 (2000-11-02) page 15, line 13 - line 23 page 16, line 14 -page 20, line 16 figures 7,11,12	1-4,7-9
	-/--	

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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- *&* document member of the same patent family

Date of the actual completion of the international search

27 March 2003

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/ZA 02/00201

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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